



Growing Canada Prairie Spring Wheat

91-02375/

Parm Facts

Produced by Saskatchewan Agriculture and Food and Saskatchewan Rural Development

The Canada Prairie Spring (CPS) class of wheat was established in 1985.

Wheats of this type are widely used in the Middle East and Asia for making flat and French-type breads, steamed buns, and noodle products. The Middle East and Asia represent a growing market potential. CPS wheat has a medium level of flour protein, kernel hardness, and gluten strength. These attributes are quite similar to those of the Red Winter class.

Varieties

The CPS class has two subdivisions based on red and white kernel colour.

HY320, the first variety in the CPS (red) class, may be deregistered for the 1990-91 crop year. Biggar, registered for production in 1989, has harder kernels than HY320 and improvements in other quality factors associated with kernel hardness such as flour yield, flour colour, higher water absorption, stronger dough characteristics, and better baking performance. Biggar is similar to HY320 in agronomic performance and disease resistance. Oslo, registered for production in 1987, is similar in maturity to Neepawa and lower yielding than HY320 and Biggar. Oslo has slightly shorter, stronger straw than HY320 and Biggar. HY355, a CPS (white) wheat,

was registered in 1988 to allow the Canadian Wheat Board to evaluate its market potential. The information provided in this pamphlet for growing Biggar and HY355 also applies to Oslo.

Yield and Other Agronomic Traits

Both HY320 (Table 1) and HY355 (Table 2) outyield Neepawa by an average of over 20%. Yields of Biggar will be the same as those of HY320 because of the genetic similarity of the two varieties. The yields of the CPS varieties relative to Neepawa vary with year and location; the yield advantage of Biggar over Neepawa is generally greater under more favourable moisture conditions.

Table 1. Yield of HY320 (Biggar will be similar), expressed as percentage of Neepawa, based on data from the High Yielding Wheat Co-operative Tests in 1974-1978 and 1981-1988.

Year	Eastern Prairies	Brown and Dark Brown Soils	Parkland and Peace River	Average
1974	131	116	120	123
1976	139	128	135	136
1977	146	129	133	135
1978	126	135	145	122
1981	123	124	117	130
1982	138	130	120	122
1983	124	125	111	118
1984	114	114	132	118
1985	130	126	142	131
1986	126	127	141	128
1987	106	115	113	111
1988	105	110	139	115
Average*	126	123	130	124
No. of tests	62	72	31	165

* Average weighted by the number of tests grown in each year.

HY355 shows good heat and drought tolerance, and is well-adapted to the Brown and Dark Brown Soil Zones. In these areas HY355 yields more than HY320. HY355, like the durums, tends to be more susceptible to weathering damage than the CWRS wheats: weathering damage is less likely in the Brown and Dark Brown soil zones than in other areas.

Table 2. Yield of HY355, expressed as percentage of Neepawa, based on data from the High Yielding Wheat Co-operative Tests in 1983-1985 and 1987-1988.

Year	Eastern Prairies	Brown and Dark Brown Soils	Parkland and Peace River	Average
1983	129	141	144	137
1984	96	122	133	116
1985	118	130	122	122
1987	110	131	88	119
1988	108	114	126	114
Average*	113	128	127	121
No. of tests	26	33	9	68

* Average weighted by the number of tests grown in each year.

Biggar and HY355 mature an average of 4 to 5 days later than Neepawa. The difference is greater under high moisture conditions and lesser under dry conditions.

HY355 is slightly taller than Neepawa, whereas Biggar averages about 15 cm shorter than Neepawa. Under dry conditions the height difference between Biggar and Neepawa will be less, often in the order of about 7 cm. Biggar is classified as a semidwarf variety because of its reduced height.

Biggar has stiffer straw than Neepawa, but after lodging it does not recover as well as Neepawa. HY355 has somewhat weaker straw than Neepawa and a greater tendency to lodge.

Disease Resistance

Biggar is resistant to prevalent races of leaf and stem rust, moderately susceptible to common root rot, and

susceptible to loose smut and common bunt. HY355 is resistant to stem rust, moderately resistant to leaf rust, moderately susceptible to common root rot and loose smut, and susceptible to bunt. Seed of both varieties should be treated with a fungicide containing carbathiin (eg. Vitavax or Anchor) to control loose smut and bunt.

Marketing Opportunities

Canada's major wheat export markets have shifted to the USSR, Asia and the Middle East over the past 30 years. In 1957, 56% of our total exports went to Western Europe compared with 5% in the 1987/88 crop year. During this same period sales to Asia and the Middle East have grown from 27% to 60%. Because the major products made from wheat in Asia and the Middle East are noodles steamed buns, flat breads, and French-type breads, the end-use quality requirements for these markets differs from those in Western Europe. CPS

wheats are intended as a premium quality product for these uses.

The economic advantage of growing high yielding varieties of the Canada Prairie Spring class will depend upon delivery opportunities and price in comparison to other classes of wheat. The price of CPS wheat is expected to be somewhat less than that of CWRS grades. To off-set the lower price, farmers have to obtain higher yields from CPS varieties. A comparison based on average total payments for various wheat classes from the 1984/85 to the 1987/88 crop years (Figure 1) indicates that #1CPS would have to yield 118% of the yield of #1CWRS to provide the same gross return. The economics of growing CPS wheat will be determined by market experience over the next few years, and by the yield and agronomic characteristics of new varieties that are under development.

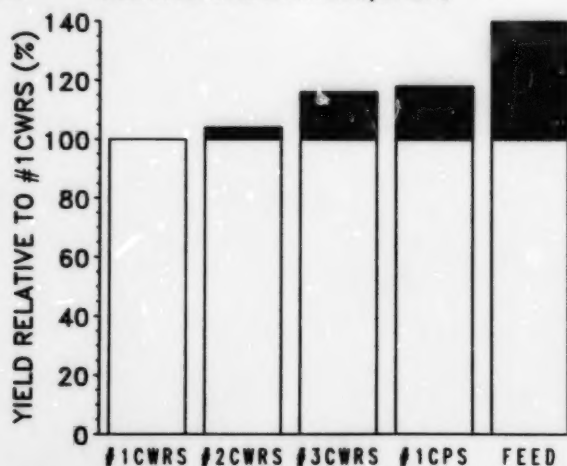


Figure 1. Yield of other class and grades required to provide the same gross return per acre as #1CWRS wheat for the 1984/85 to 1987/88 crop years.

Seeding

Date of Seeding

The best seeding date for the CPS wheats is similar to that for CWRS wheats such as Neepawa or Katepwa. Long-term data indicate that crops seeded between May 1 and May 15 in the Brown Soil Zone, and between May 10 and May 20 in the Dark Brown Soil Zone tend to produce maximum yields. Where the growing season is shorter and early fall frosts are a risk, the late-maturing CPS varieties should be planted before CWRS varieties. When seeding is delayed, the maturity difference between the CPS and CWRS varieties becomes greater.

Rate of Seeding

Aim for the same plant population as for CWRS varieties. Since the CPS varieties have larger seed than the CWRS varieties, it is necessary to increase the weight of seed sown per acre to obtain similar stands. A 25% increase should be sufficient: if you normally seed Neepawa at 67 kg per hectare (60 lbs. per acre), seed Biggar and HY355 at 84 kg/ha (75 lb/acre). A seeding rate of 70 to 80 kg per hectare (60 to 70 lbs/acre) is sufficient for CWRS wheats in the dry areas. Higher rates tend to increase yields in high rainfall areas and under irrigation. Rates as high as 160 kg per hectare (140 lb/acre) may be beneficial under irrigation.

Seeding Depth

Seed to moisture at as shallow a depth as possible, ideally 5 to 7 cm (2 to 2.75 in.). This speeds emergence and can reduce common root rot infection. Seeding at depths greater than 7 cm may cause more severe yield reductions in Biggar than in CWRS varieties. Observe the seeding depth guidelines given for soil-incorporated herbicides such as triallate (Avadex BW) and trifluralin (Fortress, Heritage, Rival, Treflan, and Triflurallex).

Seeding Equipment

Use the same seeding equipment for CPS as for CWRS varieties. Research indicates that narrow row spacings of 5 to 12 cm often have a yield advantage. Under dry conditions, seeding methods that minimize soil disturbance will aid establishment. In dry areas, seeding with a zero-till drill in stubble increases yields over that obtained from crops seeded with conventional drills. On fallow, drill type has little effect on yield, although less soil disturbance at seeding may still be beneficial in dry years.

Fertilizer Rates

The yield increase of wheat expected from fertilizer application will depend on the amount of moisture available to the crops, the amount of nutrients present in the soil, and the amount of fertilizer applied. If high amounts of nutrients are present in the soil, there will be less response to applied fertilizer. Soil testing should be the basis for determining the type and rate of fertilizer to apply.

Saskatchewan soils are likely to be deficient in nitrogen and phosphorus. Gray and Gray-Black soils are likely to be deficient in sulfur, and in light textured areas Gray-Black soils may be deficient in potassium as well. In the dry Brown Soil Zone, yield response to fertilizer will be lower than in the moisture Black Soil Zone.

The response of CPS wheats to fertilizer is similar to that of CWRS wheats. This means that fertilizer recommendations given by the provincial soil testing laboratory for spring wheat grown under dryland or irrigation are equally suitable for CPS. Biggar seems to be slightly less tolerant of seed-placed urea than CWRS varieties. Soil testing laboratory recommendations indicate that rates of 46-0-0 in excess of 28 kg N/ha (25 lb N/ac) can cause seedling damage and reduce yields. Biggar exhibits seedling damage and reduced yields at seed-placed rates of more than 20 kg N/ha (18 lb N/ha).

Weed Control

Tolerance of CPS varieties to recommended herbicides is not different from that of CWRS varieties. Biggar and HY355 are less able to compete with wild oat than Neepawa. Therefore, when growing Biggar and HY355, it is even more important to control wild oat than in the case of CWRS varieties.

Assess the weed populations in each field and plan an appropriate control program. Use the control method and herbicide that is most cost effective. Detailed recommendations can be found in the publication "Chemical Weed Control in Cereal, Oilseed, Pulse and Forage Crops."

Production Under Irrigation

Biggar grows well under irrigation, generally yielding 30 to 50% higher than CWRS varieties such as Neepawa, and similar to Fielder soft white spring wheat. A total of about 500 mm (20 in.) of water in the form of irrigation, rainfall, and

stored soil water is required to obtain maximum yields of Biggar. This is approximately 50 mm (2 in.) more than required by irrigated Neepawa.

Maturity of irrigated wheat is often delayed by 25 or more days compared to dryland, so a growing season of 120 days or longer is required for irrigated production. Under irrigation, Biggar matures about five days later than Neepawa, and is similar in maturity to Fielder. Biggar is more resistant to lodging than Fielder and similar in height.

Harvesting

CPS varieties should be swathed at the same maturity stage as CWRS varieties. It is usually safe to begin swathing when kernel moisture content is 30 to 40%, provided that the crop is reasonably evenly matured. At this moisture content the kernels will still be quite soft, but will have started to lose their green colour. If maturity is very uneven, there is a risk of grade loss due to green kernels in the harvested grain. This risk is greatest under dry harvest conditions which cause rapid drying of the swathed crop. Under these conditions it is advantageous to delay swathing until most kernels show signs of changing to a mature colour.

Combine pick-up losses increase rapidly as crop height drops below about 60 cm (2 feet). Crop heights below this level are more frequent in semidwarf varieties such as Biggar than in conventional-height varieties. The frequency of crops shorter than 60 cm is greater in the dry growing areas such as the Brown and Dark Brown Soil Zones. Straight combining of short crops is recommended.

Straight combining can reduce harvesting losses and costs in both short and average height crops. Biggar and HY355 have shattering resistance only slightly less than that of Neepawa and Katepwa, and are well-suited to straight combining. Harvest losses of HY320 (Biggar will be very similar) can be considerably greater than those of Neepawa in a swath/combine harvest system as shown in Figure 2. Losses of the two varieties are similar in a straight combine system. Even when straight combining was delayed for two weeks after the crop reached 14.5% moisture, harvesting losses of HY320 were still lower than for the swath/combine system. Straight combining can also reduce sprouting damage in wet harvest conditions.

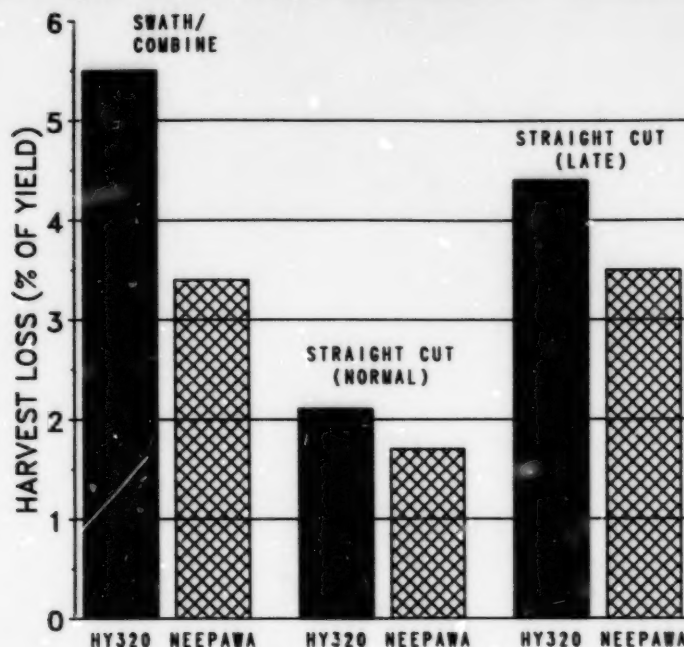


Figure 2. Harvest losses for swathed compared to straight-combined HY320 (Biggar will be very similar) and Neepawa within one week of reaching 14.5% moisture (normal) or two weeks after reaching 14.5% (late).

Acknowledgements

The research on which these recommendations are based was made possible by funding under the Canada-Saskatchewan Economic and Regional Development Agreement (ERDA) from April, 1985 through March, 1989. Professional researchers, research facilities, and land were provided by Agriculture Canada (through the Research Stations at Melfort, Regina, Saskatoon, and Swift Current) and the University of Saskatchewan.